STATE OF MISSOURI

DEPARTMENT OF NATURAL RESOURCES

MISSOURI CLEAN WATER COMMISSION

MISSOURI STATE OPERATING PERMIT

In compliance with the Missouri Clean Water Law, (Chapter 644 R.S. Mo. as amended, hereinafter, the Law), and the Federal Water Pollution Control Act (Public Law 92-500, 92nd Congress) as amended,

Permit No.	MO-0117731
Owner:	A & A, Inc.
Address:	PO Box 589, Linn Creek, MO 65052
Continuing Authority:	Same as above
Address:	Same as above
Facility Name:	A & A, Inc.
Facility Address:	Wolverine Way (Hwy. 54 & Route A), Linn Creek, MO 65052
Legal Description:	#001 (Lagoon): NW¼, NE¼, Sec. 8, T38N, R16W, Camden County #002 (Land Appl. Site): S½, SW¼, Sec. 25; SE¼, SE¼, Sec. 26; N½, NW¼, Sec. 36, T38N, R15W, Camden County
Receiving Stream:	#001: Trib to Lake of the Ozarks (U); #002: Barnett Hollow (U)
First Classified Stream and ID:	#001: Lake of the Ozarks(L2)(07205);#002: Wet Glaize Cr (P)(01147)
USGS Basin & Sub-watershed No.:	#001: 10290109-080002; #002: 10290109-070003

is authorized to discharge from the facility described herein, in accordance with the effluent limitations and monitoring requirements as set forth herein:

FACILITY DESCRIPTION

See page 2

This permit authorizes only wastewater discharges under the Missouri Clean Water Law and the National Pollutant Discharge Elimination System; it does not apply to other regulated areas. This permit may be appealed in accordance with Section 644.051.6 of the Law.

March 7, 2003
Effective Date

Stephen M. Mahfood, Director, Department of Natural Resources
Executive Secretary, Clean Water Commission

March 6 , 2008
Expiration Date

Kristine Ricketts, Regional Director, Jefferson City Regional Office

FACILITY DESCRIPTION (continued)

Outfall #001 – Private Septage/Sludge Hauler/Lagoon – SIC #7699
Septage/Sludge-only facility for no-discharge.
Two storage basins/anaerobic sludge digestion/sludge is land applied.
Design flow is 17,840 gallons per day (1-in-10 design including net rainfall minus evaporation).
Average design flow is 15,120 gallons per day (dry weather flows).
Actual flow is 4,000 gallons per day.
Design sludge production is 460 dry tons per year.

Design Basis:	**Avg Annual**
Design dry weather flows	15,120 gpd
Design with 1-in-10 year flows	17,840 gpd

Lagoon Dimensions:	Surface Area	Depth from Bottom	Pump down depth from top of berm
	basin 1/basin 2	basin 1/basin 2	basin 1/basin 2
Center Line Top Berm:	16,080 / 38,514 sq.ft.	4.0/7.0 ft. depth	3.0/6.0 ft.
Inside Top Berm:	5,080 / 8,740 sq.ft.		
Freeboard: (2.0 feet)			
Maximum operating level		2.0/5.0 ft. depth	2.0/2.0 ft.
Minimum operating level		1.0/1.0 ft. depth	3.0/6.0 ft.

Storage volume (minimum to maximum water levels):200,000 gallons 1,000,000 gallons

1-in-10 year annual stormwater flows into lagoons: 132,820 cu.ft. (993,500 gallons)

Days of Storage

Storage Capacity:	**Average Annual**
Design for Dry weather Flows:	80 days
Design with 1-in 10 year flows:	70 days

Outfall #002 - Land Application
Sludge volume/year: 6,511,600 gallons (including 1-in-10 year flows); 460 dry tons/year
Application areas: 85.5 acres at design loading (85.5 acres total available)
Application rates/acre: 5.4 dry tons/year
Field slopes: less than 12 percent
Equipment type: multiple tank trucks
Vegetation: grass land
Application rate is based on: plant available nitrogen loading rate
Other (describe):lime is added to septage.

EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

The permittee is authorized to discharge from outfall(s) with serial number(s) as specified in the application for this permit. The final effluent limitations shall become effective upon issuance and remain in effect until expiration of the permit. Such discharges shall be controlled, limited and monitored by the permittee as specified below:

OUTFALL NUMBER AND EFFLUENT PARAMETER(S)	UNITS	FINAL EFFLUENT LIMITATIONS			MONITORING REQUIREMENTS	
		DAILY MAXIMUM	WEEKLY AVERAGE	MONTHLY AVERAGE	MEASUREMENT FREQUENCY	SAMPLE TYPE
Outfall #001 - Emergency discharge from storage or land application (Note 1)						
Flow	MGD	*		*	once/day**	24 hr. estimate
Biochemical Oxygen Demand$_5$	mg/L		45	45	once/week**	grab
Total Suspended Solids	mg/L		45	45	once/week**	grab
Fecal Coliform	#/100mL	****		****	once/week**	grab
pH – Units	SU	***		***	once/week**	grab
Ammonia nitrogen as N	mg/L	****		****	once/week**	grab
Nitrate/nitrite as N	mg/L	****		****	once/week**	grab
Temperature (degrees)	°C	****		****	once/week**	grab
Oil and Grease	mg/L	****		****	once/week**	grab
MONITORING REPORTS SHALL BE SUBMITTED QUARTERLY; THE FIRST REPORT IS DUE April 28, 2003.						
Outfall #001 - Land Application Operational Monitoring (Notes 2 & 3)						
Basin Freeboard	feet	*			once/month	measured
Land Application Period	hours	*			daily	total
Volume Applied	gallons; dry tons	*			daily	total
Application Area	acres	*			daily	total
Application Rate	inches/ acre	*			daily	total
Rainfall	inches	*			daily	total
MONITORING REPORTS SHALL BE SUBMITTED ANNUALLY; THE FIRST REPORT IS DUE January 28, 2004. THERE SHALL BE NO DISCHARGE OF FLOATING SOLIDS OR VISIBLE FOAM IN OTHER THAN TRACE AMOUNTS.						

B. STANDARD CONDITIONS

IN ADDITION TO SPECIFIED CONDITIONS STATED HEREIN, THIS PERMIT IS SUBJECT TO THE ATTACHED Part I STANDARD CONDITIONS DATED October 1, 1980, AND HEREBY INCORPORATED AS THOUGH FULLY SET FORTH HEREIN.

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

The permittee is authorized to discharge from outfall(s) with serial number(s) as specified in the application for this permit. The final effluent limitations shall become effective upon issuance and remain in effect until expiration of the permit. Such discharges shall be controlled, limited and monitored by the permittee as specified below:

OUTFALL NUMBER AND EFFLUENT PARAMETER(S)	UNITS	FINAL EFFLUENT LIMITATIONS			MONITORING REQUIREMENTS	
		DAILY MAXIMUM	WEEKLY AVERAGE	MONTHLY AVERAGE	MEASUREMENT FREQUENCY	SAMPLE TYPE
Outfall #002 - Sludge Land Applied (Notes 4 and 5)						
Total Suspended Solids	mg/kg	*			once/quarter	grab
Total Kjeldahl Nitrogen as N	mg/kg	*			once/quarter	grab
Ammonia Nitrogen as N	mg/kg	*			once/quarter	grab
Nitrate/Nitrite as N	mg/kg	*			once/quarter	grab
Oil and Grease	mg/kg	*			once/quarter	grab
pH – Units	SU	*			once/quarter	grab
Priority Pollutants	mg/kg	*			once/year	grab
Toxicity Characteristics Leaching Procedure (TCLP)	mg/l	note 7			once/year	grab
MONITORING REPORTS SHALL BE SUBMITTED QUARTERLY; THE FIRST REPORT IS DUE April 28, 2003.						
Outfall #002 - Land Application - Soil Monitoring (Note 6)						
Ammonia Nitrogen as N	mg/kg	*			once/year	composite
Nitrate/Nitrite as N	mg/kg	*			once/year	composite
Chlorides	mg/kg	*			once/year	composite
Oil and Grease	mg/kg	*			once/year	composite
Available Phosphorus as P (Bray 1-P method)	mg/kg	*			once/3 years	composite
Total Sodium	mg/kg	*			once/3 years	composite
Exchangeable Sodium Percentage	%	10			once/3 years	composite
pH Units	SU	6.0-7.5			once/3 years	composite
Cation Exchange Capacity	CEC	*			once/3 years	composite
Organic Matter	%	*			once/3 years	composite
MONITORING REPORTS SHALL BE SUBMITTED ANNUALLY; THE FIRST REPORT IS DUE January 28, 2004. THERE SHALL BE NO DISCHARGE OF FLOATING SOLIDS OR VISIBLE FOAM IN OTHER THAN TRACE AMOUNTS.						

B. STANDARD CONDITIONS

IN ADDITION TO SPECIFIED CONDITIONS STATED HEREIN, THIS PERMIT IS SUBJECT TO THE ATTACHED Part I STANDARD CONDITIONS DATED October 1, 1980, AND HEREBY INCORPORATED AS THOUGH FULLY SET FORTH HEREIN.

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS (continued)

* Monitoring requirement only.
** Monitor only when discharge occurs. Report as no-discharge when a discharge does not occur during the report period.
*** pH is measured in pH units and is not to be averaged. The pH is to be maintained at or above 6.0 pH units.
**** Comply with water quality standards per Special Conditions #4.

Note 1 - **No-discharge facility requirements**. Sludge shall be stored and land applied during suitable conditions so that there is no-discharge from the storage site or land application site. An emergency discharge may occur when excess wastewater has accumulated above feasible land application rates due to precipitation exceeding the 1-in-10-year 365 day rainfall or the 25- year 24-hour storm event. The emergency discharge shall not cause a violation of water quality standard general or specific water quality criteria in 10 CSR 20-7.031.

Note 2 - Records shall be maintained and summarized into an annual operating report which shall be submitted by January 28th of each year. See Special Conditions.

Note 3 – Storage basin freeboard shall be reported as basin water level in feet below the overflow level. See Special Conditions for Land Application System requirements.

Note 4 - Sludge that is land applied shall be sampled at the storage basin or application vehicle.

Note 5 - Monitor once per quarter in the months of March, May, July and October.

Note 6 - Sample the top 6 to 12 inches of soil. Composite samples shall be collected from each land application site and each soil type in accordance with University of Missouri publication G9110, Sampling Your Soil for Testing. Testing shall conform to Soil Testing Procedures for North Central Region (North Dakota Agricultural Experiment Bulletin 499-Revised); Methods of Soil Analysis, American Society of Agronomy, Inc; Soil Testing and Plant Analysis, Soil Science Society of America Inc; EPA Methods; or other methods approved by the department.

Note 7 -The toxicity characteristics shall be determined using the Toxicity Characteristics Leaching Procedure (TCLP) in accordance with 40 CFR 261.24. If any contaminants exceed the regulatory level contained in table 1 of 40 CFR 261.24, the sludge shall be disposed in accordance with Missouri Hazardous Waste Regulations in 10 CSR 25.

C. SPECIAL CONDITIONS

1. Report as no-discharge when a discharge does not occur during the report period.

2. Outfalls must be marked in field and on the topographic site map submitted with the permit application.

3. Permittee will cease discharge by connection to area wide wastewater treatment system within 90 days of notice of its availability.

4. Water Quality Standards
   a. Discharges to waters of the state shall not cause a violation of water quality standards rule under 10 CSR 20-7.031, including both specific and general criteria.

C. SPECIAL CONDITIONS (continued)

4. Water Quality Standards (continued)

b. General Criteria. The following general water quality criteria shall be applicable to all waters of the state at all times including mixing zones. No water contaminant, by itself or in combination with other substances, shall prevent the waters of the state from meeting the following conditions:
(1) Waters shall be free from substances in sufficient amounts to cause the formation of putrescent, unsightly or harmful bottom deposits or prevent full maintenance of beneficial uses;
(2) Waters shall be free from oil, scum and floating debris in sufficient amounts to be unsightly or prevent full maintenance of beneficial uses;
(3) Waters shall be free from substances in sufficient amounts to cause unsightly color or turbidity, offensive odor or prevent full maintenance of beneficial uses;
(4) Waters shall be free from substances or conditions in sufficient amounts to result in toxicity to human, animal or aquatic life;
(5) There shall be no significant human health hazard from incidental contact with the water;
(6) There shall be no acute toxicity to livestock or wildlife watering;
(7) Waters shall be free from physical, chemical or hydrologic changes that would impair the natural biological community;
(8) Waters shall be free from used tires, car bodies, appliances, demolition debris, used vehicles or equipment and solid waste as defined in Missouri's Solid Waste Law, section 260.200, RSMo, except as the use of such materials is specifically permitted pursuant to section 260.200-260.247.

5. Reopener Clauses
This permit may be reopened and modified or alternatively revoked and reissued, to incorporate new or modified limitations or other conditions pertaining to phosphorus application rates to soils, the adequacy of wastewater lagoon liners, or other special conditions as may be necessary to protect waters of the state.

Comprehensive Nutrient Management Plan. The permit may be modified or reopened to require submittal of a Comprehensive Nutrient Management Plan CNMP) in accordance with USEPA and USDA guidelines and regulations or where determined appropriate by the department to meet water quality standards for nutrients. This determination may be based upon ambient water quality monitoring, Section A monitoring requirements and other applicable information.

This permit may be reopened and modified, or alternatively revoked and reissued, to:
(a) Comply with any applicable effluent standard or limitation issued or approved under Sections 301(b)(2)(C) and (D), 304(b)(2), and 307(a) (2) of the Clean Water Act, if the effluent standard or limitation so issued or approved:
(1) contains different conditions or is otherwise more stringent than any effluent limitation in the permit; or
(2) controls any pollutant not limited in the permit.
(b) Incorporate new or modified effluent limitations or other conditions, if the result of a waste load allocation study, toxicity test or other information indicates changes are necessary to assure compliance with Missouri’s Water Quality Standards.
(c) Incorporate new or modified effluent limitations or other conditions if, as the result of a watershed analysis, a Total Maximum Daily Load (TMDL) limitation is developed for the receiving waters which are currently included in Missouri’s list of waters of the state not fully achieving the state’s water quality standards, also called the 303(d) list.
The permit as modified or reissued under this paragraph shall also contain any other requirements of the Clean Water Act then applicable.

C. SPECIAL CONDITIONS (continued)

6. Changes in Discharges of Toxic Substances

The permittee shall notify the Director as soon as it knows or has reason to believe:

a. That any activity has occurred or will occur which would result in the discharge of any toxic pollutant which is not limited in the permit, if that discharge will exceed the highest of the following "notification levels:"
   (1) One hundred micrograms per liter (100 ug/L);
   (2) Two hundred micrograms per liter (200 ug/L) for acrolein and acrylonitrile; five hundred micrograms per liter (500 ug/L) for 2,5 dinitrophenol and for 2-methyl-4, 6-dinitrophenol; and one milligram per liter (1 mg/L) for antimony;
   (3) Five (5) times the maximum concentration value reported for the pollutant in the permit application;
   (4) The level established in Part A of the permit by the Director.

b. That they have begun or expect to begin to use or manufacture as an intermediate or final product or byproduct any toxic pollutant which was not reported in the permit application.

8. Sludge and Biosolids Use For Domestic Wastewater Treatment Facilities

a. Permittee shall comply with the pollutant limitations, monitoring, reporting, and other requirements in accordance with the attached permit Standard Conditions.

b. Permittee is authorized to land apply biosolids that are removed from the domestic wastewater treatment lagoon during lagoon clean-out and maintenance activities. Permit Standard Conditions, Part III shall apply to the land application of biosolids. Permittee shall notify the department at least 180 days prior to the planned removal of biosolids from the lagoon. The department may require submittal of a biosolids management plan for department review and approval as determined appropriate on a case-by-case basis.

9. Lagoons and earthen basins shall have a liner that is designed, constructed and maintained in accordance with 10 CSR 20-8.020(13)(A)4. If operating records indicate, excessive percolation, the department may require a water balance test in accordance with 10 CSR 20-8.020(16) or other investigations to evaluate adequacy of the lagoon seal. The department may require corrective action as necessary to eliminate excess leakage.

10. Annual Report (Outfall #001)

An annual report is required in addition to the quarterly reporting under Section A of this permit. The annual report shall be submitted by January 28 of each year for the previous growing season from October 1 through September 30 or an alternate 12 month period approved by the Department and listed in the Operation and Maintenance Manual. This report shall be submitted using report forms approved by the Department and shall include a summary of the monitoring and record keeping required by the Special Conditions and Standard Conditions of this permit. The report shall include the following:

a. Record of maintenance and repairs performed during the year, average number of times per month the facility is checked to see if it is operating properly, and description of any unusual operating conditions encountered during the year;

b. The number of days the facility has discharged during the year, the discharge flow, the reasons discharge occurred and effluent analysis performed; and

c. A summary of the land application operations including storage basin freeboard at the start and end of the application season, the number of days of land application for each month, the total gallons and dry tons applied, the total acres used, crops grown, crop yields per acre, the application rate in gallons/acre per day and gallons and dry tons/acre for the year, the monthly and annual precipitation received at the facility and summary of testing results.

C. SPECIAL CONDITIONS (continued)

11. Sludge Land Application System – Industrial Sludge. (Outfall #002)

a. Land Application Design – No-Discharge. Design and operation shall be in accordance with 10 CSR 20-8.020(15). Permittee shall operate the land application system in accordance with the design parameters listed in the Facility Description section of this permit. Sludge shall be stored and land applied during suitable conditions so that there is no-discharge from the storage site or land application site. An emergency discharge may occur when excess wastewater has accumulated above feasible land application rates due to precipitation exceeding the 1-in-10-year 365 day rainfall or the 25- year 24-hour storm event. The emergency discharge shall not cause a violation of water quality standard general or specific water quality criteria in 10 CSR 20-7.031.

b. Metals Loading Limitations. Application of trace metals shall not exceed the concentrations and loading limits for each metal as specified in University of Missouri publication WQ 425, revised 4/95. When metals concentrations exceed values in Table 2 of WQ-425, the remaining metals capacity of the site will be calculated each time biosolids are spread. When the cumulative limit is reached, biosolids addition will be halted.

c. Storm Water Runoff. There shall be no contaminants discharged from the land application sites by storm water that cause violation of the Water Quality Standards rules for general criteria and specific criteria under 10 CSR 20-7.031.

d. Discharge Reporting. Any unauthorized discharge from storage, treatment or land application system shall be reported to the department as soon as possible but always within 24 hours. Discharge is allowed only as described in the Facility Description and Effluent Limitations sections of this permit.

e. Land Application Site Locations. The permittee shall land apply only to suitable sites located within the overall property boundaries and descriptions listed in the permit application and approved Operation and Maintenance Manual. Permittee requests for additional sites including non-owned property must follow permit modification procedures prior to land application. To request additional sites, the permittee should submit a revised application Form A and R, mailing addresses for first down stream land owners of each site, topographic maps and other pertinent information for the proposed sites.

f. Subsurface Injection Requirement. Subsurface Injection or immediate incorporation after surface application should be considered where feasible and practicable to reduce exposure to wash off by storm water runoff and to retain nutrients in the soil for crop requirements. Surface application may be used when practical in accordance with procedures in the approved Operation and Maintenance Manual.

g. Saturated/Frozen Conditions. There shall be no land application during frozen, snow covered, or saturated soil conditions. There shall be no application on days when there is observation by operator of an imminent or impending rainfall event. An on-site visual investigation of the field’s soil moisture condition, followed by testing of the soils, will be made to determine whether land application can occur. The visual and soil test procedures will be reviewed and approved by the department as part of the Operation and Maintenance Manual.

h. Buffer Zones. There shall be no land application within 300 feet of any down gradient pond, lake, sinkhole, losing stream or water supply withdrawal and within 150 feet of dwelling. For surface application, there shall be no land application within 100 feet of gaining streams (Class P and C classified streams listed in Water Quality Standard rule under 10 CSR 20-7.031); 50 feet of wet weather gaining streams and tributaries (unclassified streams); or 50 feet of the property line. For subsurface injection, buffer zones may be reduced to 25 feet from gaining streams (classified and unclassified).

C. SPECIAL CONDITIONS (continued)

11. Sludge Land Application System – Industrial Sludge (continued)

i. Application Equipment. The application system shall be operated so as to provide uniform distribution of wastes over the entire land application site. Land application shall occur only during daylight hours. The application system shall be capable of applying the annual design flow during an application period of less than 100 days or 800 hours per year.

j. Equipment Checks during Land Application. The appllication system and application site shall be visually inspected at least once/hour during land application to check for equipment malfunctions and runoff from the application site.

k. Biosolids Transport. Biosolids will be hauled to the application site by highway tanker trailer. Any spillage from the transporting operation must be cleaned up immediately, and the quantity spilled must be reported within twenty-four (24) hours.

l. Public Access Restrictions. Public access shall not be allowed to the land application site(s). Fencing and public access restrictions to land application sites shall be in accordance with requirements in 10 CSR 20-8.020(15)(b)(5).

m. Fact Sheets. Fact sheets shall be prepared for each application site giving the following information. Land owners name, address, telephone number, acreage, designation of buffer zones around limiting features, nutrient content of biosolids and the application rates with the maximum per year. The actual boundaries of the allowed land application locations will be marked on each site prior to the injecting of biosolids.

n. Daily Log Sheets. Daily log sheets shall be prepared and kept for each application site showing amounts of biosolids applied per acre, dates of application, nutrients applied, and crop yields.

o. Construction of Biosolids Storage. If additional biosolids storage facilities become necessary, a construction permit shall be obtained before construction of such facilities begins, and the facilities shall be built in accordance with the appropriate regulations and design guides.

p. Storage Basin Operating Levels - No-discharge Systems. The minimum and maximum operating water levels for the storage basin shall be clearly marked. Each lagoon shall be operated so that the maximum water elevation does not exceed one foot below the overflow point except due to exceedances of the 1-in-10 year or 25-year-24 hour storm events. Wastewater shall be land applied whenever feasible based on soil and weather conditions and permit requirements. Storage lagoon(s) shall be lowered to the minimum operating level prior to each winter by November 30.

q. Emergency Spillway. Earthen storage basins shall have an emergency spillway to protect the structural integrity of earthen structures during operation at near full water levels and in the event of overflow conditions. The spillway shall be at least one foot below top of berm. The department may waive the requirement for overflow structures on small existing basins.

C. SPECIAL CONDITIONS (continued)

12. Nutrient Management

a. Permittee shall develop and implement a Nutrient Management Plan (NMP) based on crop requirements for nitrogen and phosphorus. Biosolids application rates shall be based on the most limiting nutrient for a realistic crop yield when considering all nutrient sources including other sludge, manure and commercial fertilizer. The plan shall be developed in accordance with NRCS state standards and guidelines.

b. Phosphorus.
Phosphorus application rates shall be based on NRCS state standards and guidelines for one of the following methods:
(1) Phosphorus Index method.
(2) Phosphorus Threshold method.
(3) Soil Test Phosphorus method

c. Nitrogen applications shall not exceed the Plant Available Nitrogen (PAN) approach as outlined in the reference publications listed in this section. The biosolids application rate for nitrogen is calculated based on the following procedure:

Crop Nitrogen Requirement for realistic yield goal
- Soil residual nitrogen from crop residues
- Organic nitrogen from previous 3 years of biosolids applications
- Nitrogen from commercial fertilizer and other sources
= PAN nitrogen required from biosolids.

(1) Plant Available Nitrogen (PAN) is calculated as follows:
Ammonia N x availability factor
+ Organic N x availability factor
+ Nitrate N x availability factor
= PAN

(2) Nitrogen availability factors for ammonia nitrogen.

Ammonia Nitrogen Availability	
Surface Application	Subsurface Injection
0.6	0.9

C. SPECIAL CONDITIONS (continued)

12. Nutrient Management (continued)

(3) Nitrogen availability factors for organic nitrogen.
(Total Kjeldahl Nitrogen minus ammonia nitrogen = organic nitrogen).

Sludge Treatment Method	Organic Nitrogen Availability by Time Period After Sludge Application *			
	Year 1	Year 2	Year 3	Total
Composted Sludge (Class A)	0.10	0.05	0.05	0.20
Sludge in aerobic wastewater treatment lagoon (average sludge age of >7years)	0.10	0.05	0.05	0.20
Anaerobic sludge digester	0.20	0.10	0.05	0.35
Aerobic sludge digester	0.30	0.15	0.05	0.50
Sludge from secondary wastewater treatment system (includes sludge storage and/or lime stabilization process)	0.40	0.15	0.05	0.60
* NOTE: The organic nitrogen availability reaches a constant after 3 years. Use the total column when sludge is applied to the same field for 3 years or longer. Use the total column for planning purposes.				

(4) Nitrogen availability factors for nitrate nitrogen.

Nitrate availability = 0.9

(5) Soil Residual Nitrogen availability from crop residues shall be calculated based on soil testing for organic matter and CEC. See reference publication c. and d. in subsection H.10, below.

(a) For Perennial Crops the SRN is considered zero(0) for purposes of these calculations because the SRN has already been considered in the crop fertilization recommendations in the referenced publications.
(b) For Annual Crops, the nitrogen availability from soil organic matter must be calculated based on soil CEC and crop season. Contact the soil test laboratory to see if they have already included this prediction in their soil test report for annual crops. If not, calculate SRN as follows:

C. SPECIAL CONDITIONS (continued)

12. Nutrient Management (continued)

SRN in pound N/acre* = [percent organic mater] x Soil Availability Factor

Soil Residual Nitrogen Availability Factor by Soil CEC and Organic Matter				
Growing Season	Organic Matter	LBS/ACRE N by Soil CEC Range		
		<10 CEC	10-18 CEC	>18 CEC
Summer	1%	40*	20	10
Winter	1%	20*	10	5
***Note:** If CEC is less than 10 and organic matter is 1.5% or greater, the total SRN is constant at 60 pounds nitrogen for summer and 30 pounds for winter.				

d. Crop Nitrogen Requirements (CNR)

(1) CNR shall be based on realistic crop yield goals based on actual on-site yields or county average yields listed in the county soil survey report. To predict the yield goal, use the on-site yields for the last ten years; throw out the highest and lowest yields; then average the remaining 8 years and add 10-20%.
(2) Supplemental nitrogen may be added to row crops when determined necessary for proper plant growth based on testing of plant vegetation or soil nitrate testing during the growing season. Procedures will be included in the Nutrient Management Plan.
(3) If a crop is not harvested, the CNR rate shall not exceed 40 lbs/acre/year and grass vegetation must be maintained on the site.
(4) For nutrient requirements of specific crops and yields, refer to reference publications listed in this permit.

e. Commercial Fertilizer Nitrogen (CFN) Planned or previous applications of nitrogen from commercial fertilizer, sludge, biosolids and manure must be evaluated to determine nitrogen availability from these sources. Part of the organic nitrogen applied in the previous 2 years will be available in this years growing season. This nitrogen contribution from other nitrogen sources is not included in the soil residual nitrogen (SRN) calculations and must be calculated separately using the PAN methods listed herein.

f. If a crop is not harvested, the PAN rate shall not exceed 40 lbs/acre/year and grass vegetation must be maintained on the site.

g. PAN calculations, application amounts, crop yields and crop removal rates shall be listed in the annual report.

h. Conversion Factors for laboratory testing results:
[mg/L or mg/kg or ppm] x [conversion factor] = [pounds per Unit Volume]

Unit Volume	Conversion Factors
lbs/acre inch	0.226
lbs/1,000 gallons	0.0083
lbs/100 cubic feet	0.0062
lbs/ton (wet wt)	0.002

C. SPECIAL CONDITIONS (continued)

12. Nutrient Management (continued)

i. Alternate nitrogen availability factors may be considered based upon site specific conditions for each field based on NRCS state standards and guidelines. Alternate factors will be reviewed as part of the Nutrient Management Plan.

j. Supplemental nitrogen may be added to row crops when determined necessary for proper plant growth based on testing of plant vegetation or soil nitrate testing during the growing season. Procedures will be reviewed and approved by the department as part of the Operation and Maintenance Manual.

k. Primary reference publications used herein are:

1. Livestock Waste Facilities Handbook, Midwest Plan Service, MWPS-18, April 1993.
2. National Engineering Handbook, Part 651, Agricultural Waste Management Field Book, USDA, Natural Resources Conservation Service (NRCS), April 1992 and current supplements.
3. Managing Nitrogen for Groundwater Quality and Farm Profitability, Soil Science Society of America, Inc., 1991.
4. Soil Test Interpretations and Recommendations Handbook, University of Missouri, Department of Agronomy, December 1992.
5. Land Application of Sewage Sludge, EPA/831-B-93-002b, U.S. Environmental Protection Agency, December 1994.
6. How to Get a Good Soil Sample, University of Missouri Extension, G9110, Oct 1993.
7. Using Your Soil Test Results, University of Missouri Extension, G9111, Oct 1993.
8. Interpreting Missouri Soil Test Reports, University of Missouri Extension, G9112, Oct 1996.
9. Recommended Chemical Soil Test Procedures for the North Central Region, North Dakota Agricultural Experiment Bulletin 499-Revised.
10. Activity and Movement of Plant Nutrients and Other Trace Substances, University of Missouri Extension, WQ428, May 1995.
11. Crop and Nutrient Considerations of Biosolids, University of Missouri Extension, WQ430, Dec 1994.
12. Preplant Nitrogen Test for Adjusting Corn Nitrogen Recommendations, University of Missouri Extension, G9177, Mar 2000.
13 Agricultural Phosphorus and Water Quality, University of Missouri Extension, G9181, March 1999.
14. Managing Manure Phosphorus to Protect Water Quality, University of Missouri Extension, G9182, March 1999.
15. Control of Pathogens and Vector Attraction in Sewage Sludge, EPA/625-R-92/013, revised Oct 1999, http://www.epa.gov/ORD/NRMRL.
16. Benfits and Risks of Biosolids, University of Missouri Extension, WQ427, Jan 1996.
17. A Guide to the Biosolids Risk Assessments for the EPA Part 503 Rule, EPA832-B-93-005, Sep 1995.
18. WQ421, Biosolids Index of Publications, Nomenclature and Conversion Factors, University of Missouri Extension, Revised 4/95.
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